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(54) **METHOD AND APPARATUS FOR PLAYING
COMPUTER-BASED VIDEO GAMES ON
TELEVISION**

2006/0209892 A1* 9/2006 MacMullan et al. 370/468
2008/0120676 A1* 5/2008 Morad et al. 725/127
2008/0261686 A1 10/2008 Bedingfield
2009/0119730 A1* 5/2009 Perlman et al. 725/114

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FOREIGN PATENT DOCUMENTS

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CN 2092380 Y 5/2007
CN 200520037886.3 5/2007
JP 2000 051521 A 2/2000
JP 2003 190628 A 7/2003

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H04L 29/06 (2006.01)

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CPC **A63F 13/12** (2013.01); **H04L 67/38**
(2013.01); **H04N 21/4781** (2013.01)

(58) **Field of Classification Search**
USPC 709/205
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2004/0178576 A1 9/2004 Hillis et al.
2006/0030408 A1* 2/2006 Kiiskinen 463/42

OTHER PUBLICATIONS

“Independently”, see #4, Dictionary.com, <http://dictionary.reference.com/browse/independently?s=t>, Copyright 2014.*
“Near”, see #4, Dictionary.com, <http://dictionary.reference.com/browse/near?s=t>, Copyright 2014.*
“Relative”, see #5, Dictionary.com, <http://dictionary.reference.com/browse/relative?s=t>, Copyright 2014.*
International Search Report for PCT Application No. PCT/CT2010/074401.

* cited by examiner

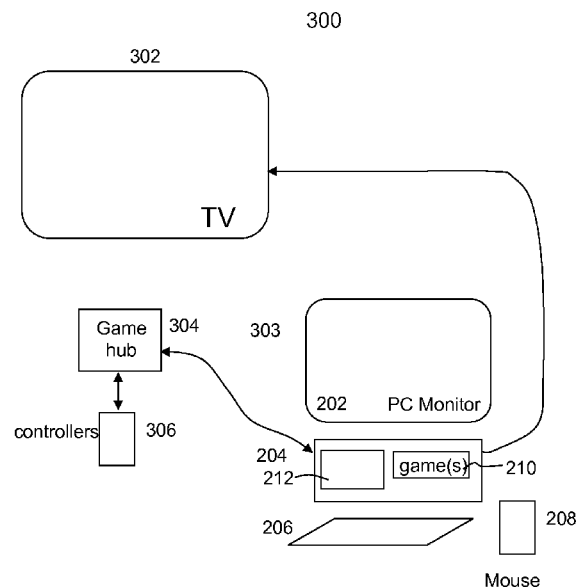
Primary Examiner — Angela Nguyen

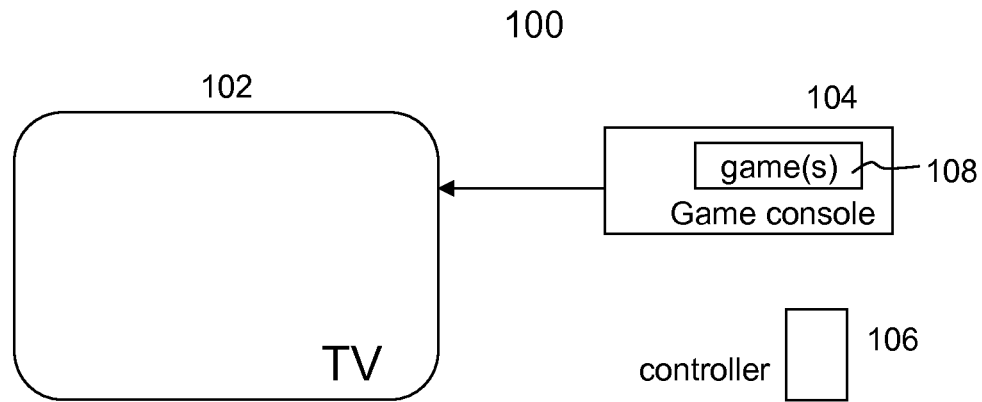
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(57) **ABSTRACT**

Techniques for providing a hybrid platform for video games are disclosed. To enjoy the video and audio quality a TV could provide, all game actions with a video game are provided via a TV. However, the video game itself is running on a generic personal computer (PC). In one embodiment, a device is provided to receive various game actions by a game player with the video game. The game hub provides an (wired or wireless) interface for transferring signals representing the game actions to the PC, in return the PC provides digital streams to the TV for display.

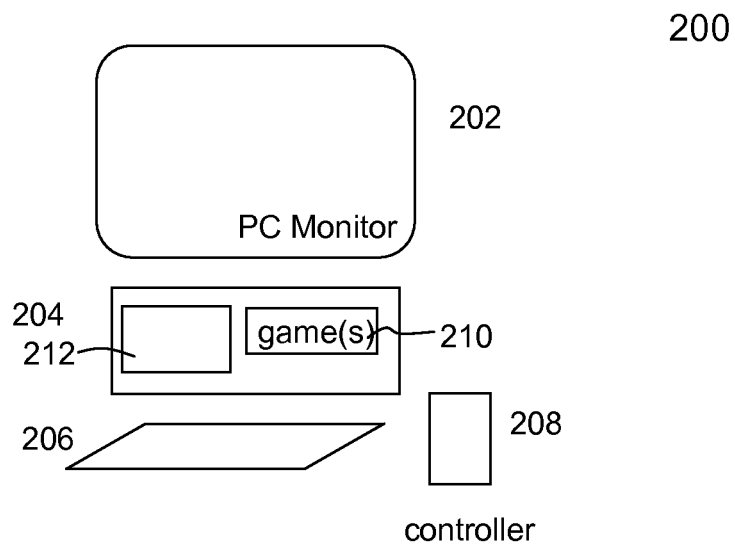
20 Claims, 6 Drawing Sheets





(Prior Art)

FIG. 1



(Prior Art)

FIG. 2

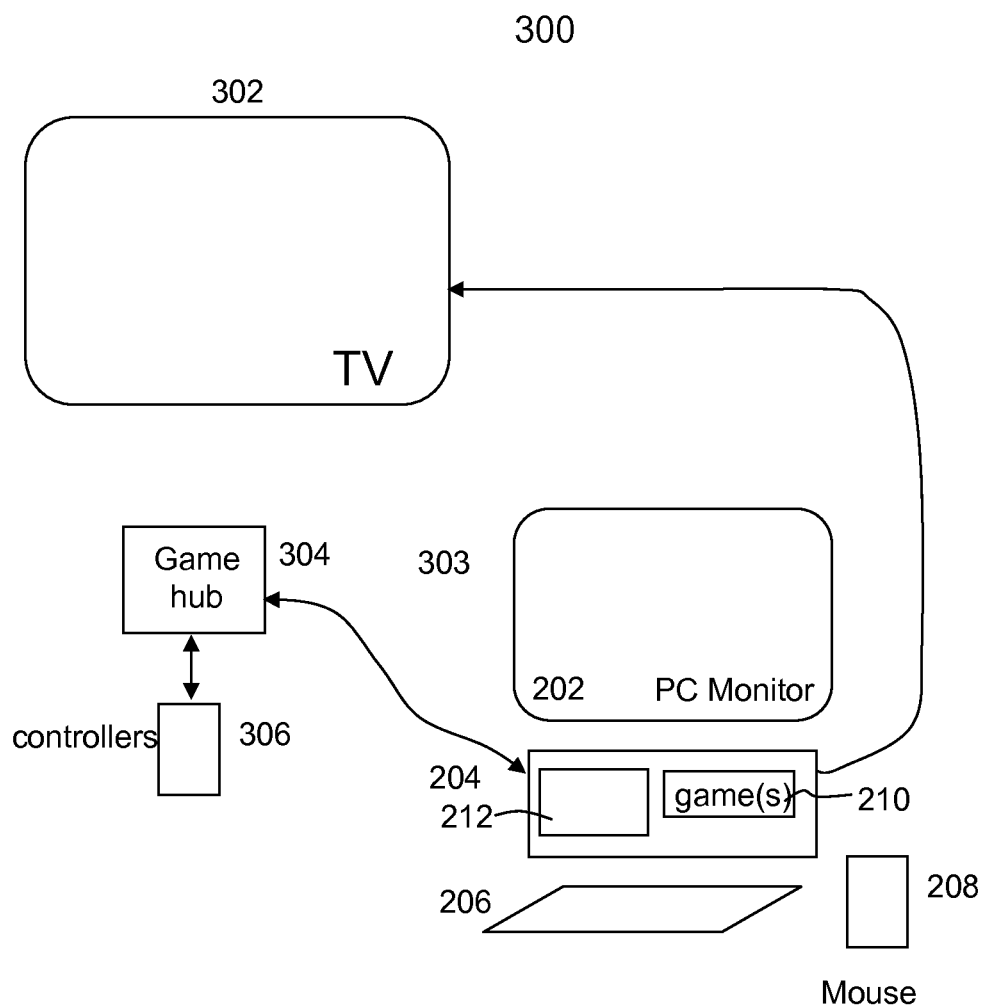
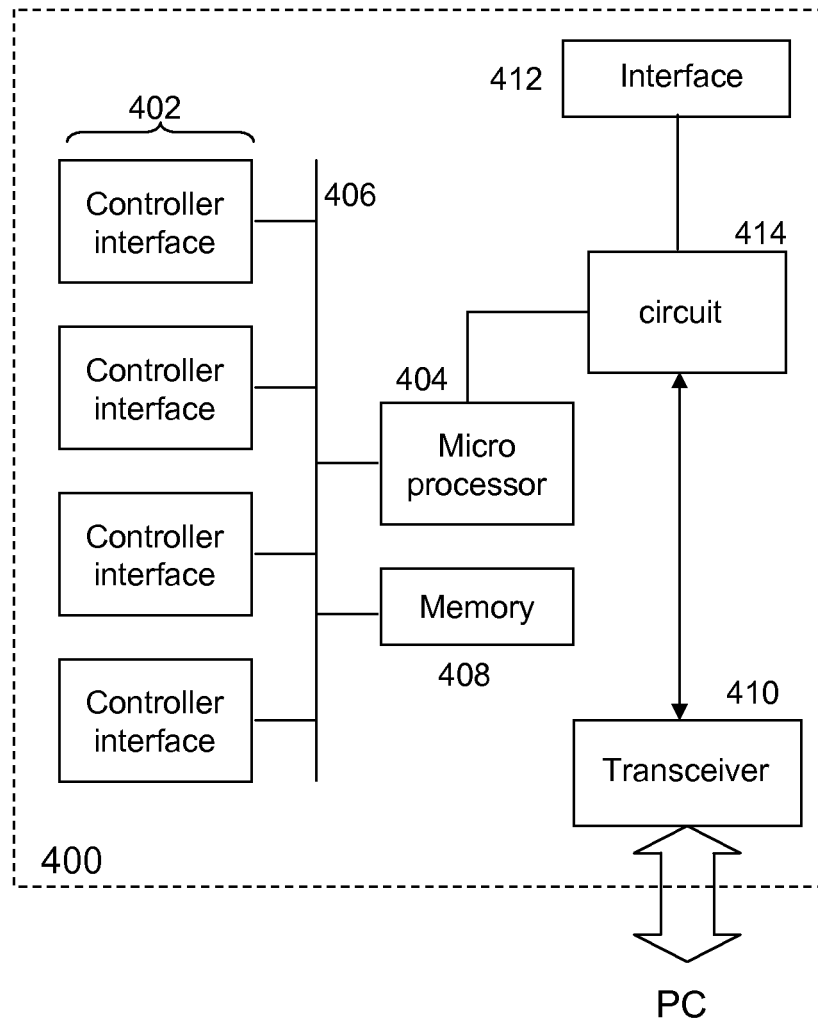


FIG. 3

**FIG. 4**

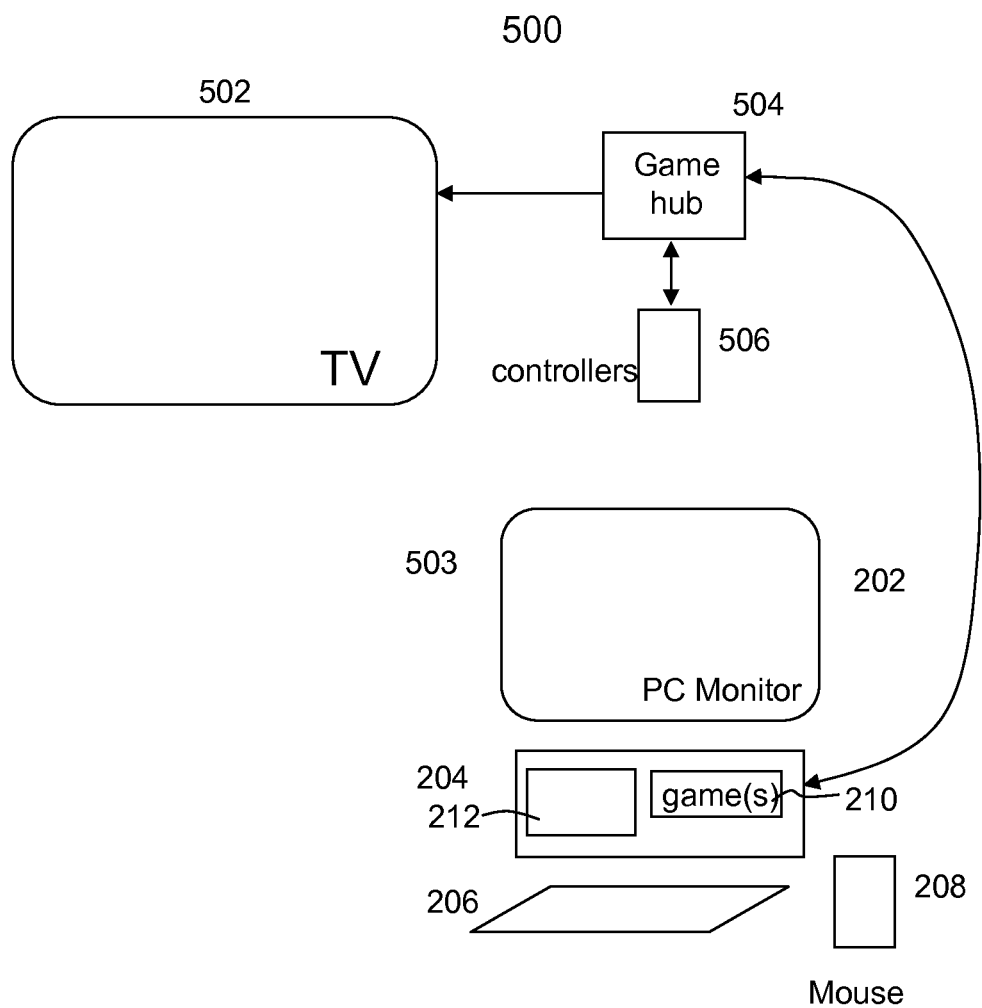
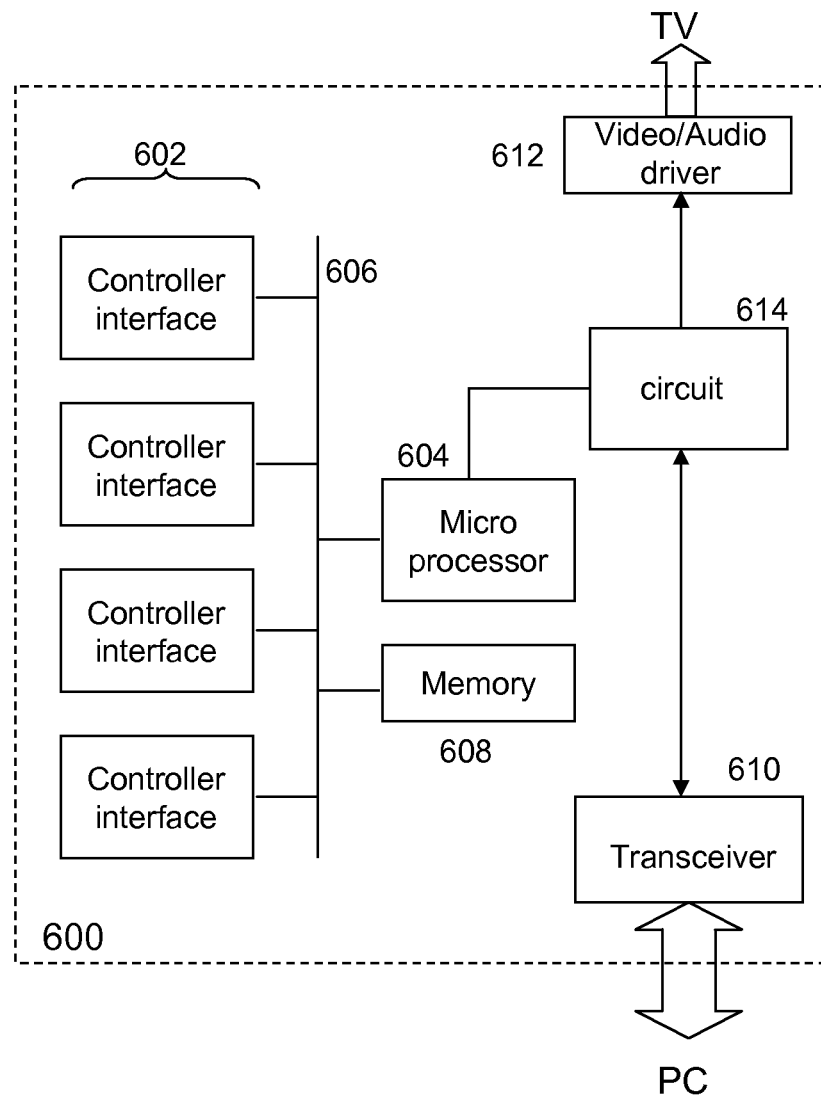


FIG. 5

**FIG. 6**

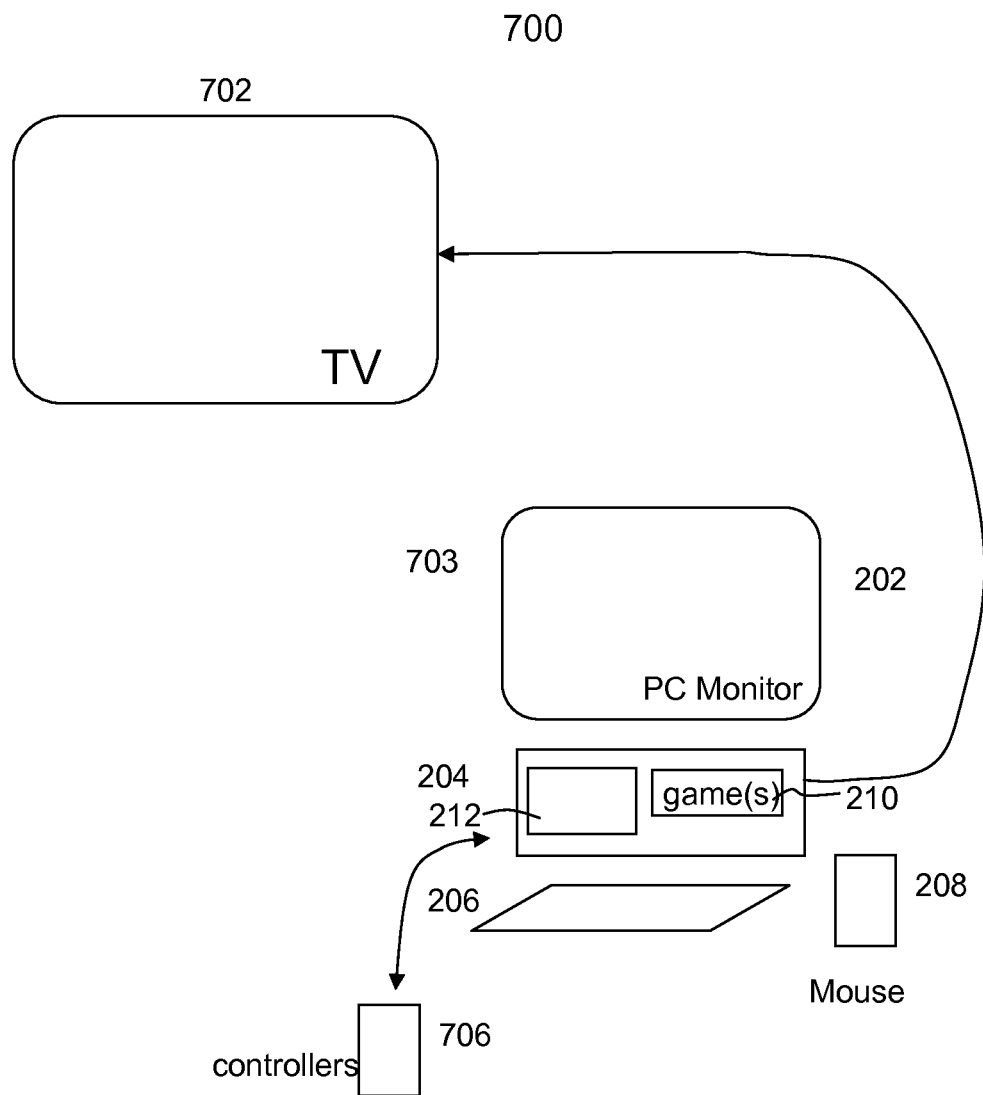


FIG. 7

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METHOD AND APPARATUS FOR PLAYING COMPUTER-BASED VIDEO GAMES ON TELEVISION

CROSS REFERENCE TO RELATED APPLICATION

This is a continuation of U.S. application Ser. No. 12/264, 260, entitled "Hybrid platform for video games", filed Nov. 4, 2008, now U.S. Pat. No. 8,073,909.

BACKGROUND

The present invention is generally related to the area of video games. In particular, the present invention is related to a hybrid platform for video games, wherein it includes a generic personal computer (PC) and a television (TV), thus providing a gaming environment and other useful features in addition to what a video game console could provide.

The present invention discloses a hybrid platform including a TV, a game hub and a generic PC. The game hub is provided to receive game actions from at least a game controller being used by a user and the TV is provided to display an uncompressed digital stream from the PC running a game in accordance with data representing the game actions.

SUMMARY

This section is for the purpose of summarizing some aspects of embodiments of the present invention and to briefly introduce some preferred embodiments. Simplifications or omissions in this section as well as in the title and the abstract of this disclosure may be made to avoid obscuring the purpose of the section, the title and the abstract. Such simplifications or omissions are not intended to limit the scope of the present invention.

Broadly speaking, the invention relate to techniques for providing a hybrid platform for video game with a plurality of useful features in addition to what a video game console could provide. To enjoy the video and audio quality a TV could provide, all game actions with a video game are provided via a TV. However, the video game itself is running on a generic personal computer (PC). According to one aspect of the present invention, a game hub is provided in the vicinity of the TV and supports a plurality of controllers to be used by one or more game players. The game hub transmits signals representing the game actions from the controller to the PC that executes the video game in accordance with the signals. Being a generic computing device, the PC is configured to execute the video game and may be used for other general purposes, such as writing documents, preparing presentations, managing finance or browsing the Internet.

According to another aspect of the present invention, the game hub is designed to allow a game player to operate the PC, for example, turn on or off the PC. In one case, the game hub allows a game player to select a video game among all others from the controller without having to go to the PC to operate the PC directly.

According to still another aspect of the present invention, the functions of the game hub are integrated in a PC. In other words, the controllers being used by the game players communicate directly with the PC while the PC provides uncompressed digital streams to the PC.

In general, a PC is more resourceful than an enclosed game console. According to still another aspect of the present invention, the PC can be equipped with programs or plug-in modules to be associated with a video game to make the video

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game more controllable in a sense that a game player may set up where a video game may be restarted, store stats and data pertaining to the game in a portable device or a game controller and start up the game from another new computing device without having to start all over again.

According to yet another aspect of the present invention, a software virtual machine may be installed on a PC running under a traditional operating system (e.g., Windows, Mac or Linux). The software virtual machine co-exists but is not part of the traditional operating system on the PC. This virtual machine allows a game player to turn on and run quickly a video game without invoking the traditional operating system. The game player in this situation could enjoy a video game play on the TV without having to wait for the longer boot (or, invoking) time of the traditional operating system.

Embodiments of the invention may be implemented in numerous ways, including a method, system, device, or a computer readable medium. Several embodiments of the invention are discussed below. In one embodiment, the present invention is a game system comprising: at least a game controller being used by a game player; a game hub coupled to the game controller and receiving signals representing various game actions from the game controller; a personal computer (PC) loaded with a video game and caused to execute and manipulate the video game in accordance with data representing the game actions, and producing corresponding uncompressed digital streams; and a television (TV) receiving the digital streams from the PC and displaying the video game to the game player. In another embodiment, the game hub acts as a bridge to facilitate a connection between the TV and the PC, where the TV receives the digital streams from the PC via the game hub.

In yet another embodiment, the present invention is a game system comprising: at least a game controller being manipulated by a game player; a personal computer (PC) loaded with a video game and caused to execute and manipulate the video game in accordance with data representing the game actions, and producing corresponding uncompressed digital streams; and a television (TV) receiving the uncompressed digital streams from the PC and displaying the video game to the game player.

There are many objects, features, and advantages in the present invention. These objects, features, and advantages will become apparent upon examining the following detailed description of an embodiment thereof, taken in conjunction with the attached drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be readily understood by the following detailed description in conjunction with the accompanying drawings, wherein like reference numerals designate like structural elements, and in which:

FIG. 1 shows a prior art configuration including a TV and a game console communicating with a game controller;

FIG. 2 shows a prior art configuration of a PC video game;

FIG. 3 shows an exemplary configuration according to one embodiment of the present invention;

FIG. 4 shows a game hub that may support up to four players at the same time and be used in FIG. 3;

FIG. 5 shows an exemplary configuration according to another embodiment of the present invention;

FIG. 6 shows a game hub that may support up to four players at the same time and be used in FIG. 5; and

FIG. 7 shows another configuration according to one embodiment of the present invention, in which functions of game controller(s) communicate with a PC directly while the PC provides video and audio signals to a TV.

DETAILED DESCRIPTION OF THE INVENTION

In the following description, numerous specific details are set forth to provide a thorough understanding of the present invention. The present invention may be practiced without these specific details. The description and representation herein are the means used by those experienced or skilled in the art to effectively convey the substance of their work to others skilled in the art. In other instances, well-known methods, procedures, components, and circuitry have not been described in detail since they are already well understood and to avoid unnecessarily obscuring aspects of the present invention.

Reference herein to “one embodiment” or “an embodiment” means that a particular feature, structure, or characteristic described in connection with the embodiment can be included in at least one implementation of the invention. The appearances of the phrase “in one embodiment” in various places in the specification are not necessarily all referring to the same embodiment, nor are separate or alternative embodiments mutually exclusive of other embodiments. Further, the order of blocks in process, flowcharts or functional diagrams representing one or more embodiments do not inherently indicate any particular order nor imply limitations in the invention.

FIG. 1 shows a prior art configuration 100 including a TV 102 and a game console 104 being interacted with a controller 106. The game console 104 is typically loaded with a game or games 108 dedicated for the type of the game console 104. A player uses the controller 106 with other possible accessories to control or manipulate the video game 108 being executed in the game console 104 but being displayed on the TV 102. Although the game console 104 may or may not be connected to a server or another game console via the Internet, the game console 104 displays all resulting video sequences (video and audio signals) on the TV 102. One important feature of FIG. 1 is that the game console 104 includes all the necessary logics in an enclosure to execute a video game 108 and output signals directly to the TV 102.

The game console 104, where the logic and graphics of a video game are computed and processed, has an (its own) enclosure with power sourcing from an electrical outlet or batteries. The signals of game controller(s) 106 and associated accessories are connected and funneled into the game console 104 directly with wired or wireless means that in turns manipulates and controls the video game on the TV 102.

FIG. 2 shows a prior art configuration 200 of a PC video game. The configuration 200 is essentially a generic PC including a PC monitor 202, a computing base 204, a keyboard 206 and a controller (or mouse) 208. Different from a game console, a generic PC is not specifically designed for playing a video game rather for running as many applications/programs as possible. In a sense, the PC is not optimized for running a video game but may have a sufficient amount of computing power to run the video game and display the video game right on the PC monitor 202. In general, a game player must sit near the PC and look at the PC monitor 202 while playing the game. Nevertheless, the configuration 200 of FIG. 2 is not a preferable setting for group entertainment.

FIG. 3 shows an exemplary configuration 300 according to one embodiment of the present invention. The configuration 300 includes a TV 302 and a PC 303, and a game hub 304. In

general, a TV is placed in a large room (e.g. a family room) for group entertainment while the PC is placed in a small room (e.g., a home office). One of the important benefits, advantages and features in the present invention is to utilize the best of a TV and a generic PC to achieve what a game console could provide and more, allowing a game to be played in front of a TV while using the vast computing resources available on the PC 303.

According to one embodiment, on one end, the game hub 303 is placed in the vicinity of the TV 302 and coupled to a number of game controllers via a wired or wireless means (e.g., IR, RF or bluetooth). On the other end, the game hub 303 communicates with the PC 303 via a wireless means (e.g., RF, or WiFi) to transmit commands or interactions (i.e., game actions) from game controllers being used by game players. In other words, the PC 303 runs the game and executes the game actions from the game players while the TV 302 displays the game with the game actions from the game players.

FIG. 4 shows an exemplary function block diagram 400 of a game hub that may be used in FIG. 3. The game hub 400 may support in theory as many players as needed. The game hub 400 as shown in FIG. 4 supports up to four game players at a time, thus including four controller interfaces 402. Each of the controller interfaces 402 works independently in a sense that the game hub 400 functions as long as there is one controller connected to one of the controller interfaces 402. A user may manipulate a controller while looking at a TV to, for example, make a turn, run or punch an in-game object. Depending on implementation, signals or data representing game actions from the controller are coupled to the game hub 304. A microprocessor 404 executes one or more modules stored in memory 408 via a bus 406 to process the data representing the game actions from the player. A circuit 414, collectively representing all other logics in the game hub 400, is provided to convert the data into a proper form before the data is transported to a PC via a transceiver or an interface 410. Those skilled in the art may understand that, depending on how the data is transported to the PC, the circuit 414 and the transceiver 410 may be implemented differently. There are a number of methods available and well known in the art (e.g., RF, Bluetooth or WiFi).

In one embodiment, the interface 412 is provided to be coupled to one or more sensors. Depending on implementation, examples of the sensors include, but may not be limited to, motion sensors, video cameras, temperature sensors, accelerometers, gyroscopes or magnetic field sensors. With one or more appropriate sensors coupled to the interface 412, a video game may be played with more excitement or with other actions from the game players. Accordingly, the game actions as described herein may include sensor data should one or more sensors be provided or supported by the game hub 400.

It should be noted that the PC 303 in FIG. 3 is not exclusively designed for playing a game. Besides games 210, the PC 303 may be installed with other programs 212, for example, including Microsoft Office and an Internet browser. The PC 303 runs video games and can be used for other applications, for example, running Word, PowerPoint in Microsoft Office or browsing the Internet, communicating with other devices (e.g., servers or PCs).

In FIG. 3, the logic and graphics of a video game are computed and processed in the PC 303 that has an enclosure with power sourcing from an electrical outlet or batteries. The majority of the signals of game controller(s) with possible associated accessories are funneled by a wired or wireless means into the game hub 304 that has its own enclosure with

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power sourcing from an electrical outlet or batteries, and then, the signals of the game hub **304** are by a wired or wireless means funneled into the PC **304**. In return, the PC **304** manipulates the video game in accordance with the signals of the game hub **304** and controls the video game on the PC **304** and sends the resulting video game sequences (uncompressed digital streams) back to the TV. The game hub **304** serves as an intermediary and collects majority of the signals from the game controller(s) and accessories.

According to one embodiment, the game hub **304** can be controlled to operate the PC **303** without having to go to the PC **303** for operation. Keys or buttons on a game controller may be configured to function like a mouse or a remote controller. Through the game hub **304** that communicates with the PC, a user or game player may turn on or off the PC **303**, cause the PC **303** to display a list of games available from which the user may select one game to run. In another embodiment, a user may run an Internet browser in the PC to browse the Internet or run a program/application. One exemplary application is a photo display. Without gathering a group of people in a small office, a user may simply use a game controller to cause the PC **303** to start a photo presentation to the group of people in a large family room, typically with much more comfortable seating. All comments and entries made on a game controller are transported to the PC **303** as if the game controller was a mouse.

In general, a PC is more resourceful than an enclosed game console. According to one embodiment, the PC is equipped with programs or plug-in modules that are stored in memory or storage **212**. A game player may run the programs or modules to be associated with a video game to make the video game more controllable in a sense that a game player may set up where a video game may be restarted, store stats and data pertaining to the game in a game controller, or a portable device, and start up the game from another new computing device without having to start all over again. In one application, a user may email saved data pertaining to a video game to another PC where the video game may be started as if it was continued from the original PC.

One problem that exists with a PC is a relatively longer time to boot, or invoke up an operating system (e.g., Windows, Mac or Linux). Although the problem may be resolved over time, one embodiment of the present invention is to install, what is commonly referred to as a software virtual machine. The software virtual machine co-exists but is not part of the operating system on the PC. This virtual machine allows a game player to turn on and run quickly a video game without invoking the traditional operating system. The game player in this situation could enjoy a video game play on the TV without having to wait for the relatively longer boot (or invoking) time of the traditional operating system.

As described above, the communication between the game hub and the PC can be carried over the air (wireless). To have a secure environment, the PC may be installed a security module, likewise on the game hub, to have the communication secured between the PC and the game hub. Without a PC, many features that otherwise could not be done in a game console can now be implemented because the PC nowadays could be much powerful than a game console in terms of available resources.

FIG. 5 shows another exemplary configuration **500** according to one embodiment of the present invention. The configuration **500** includes a TV **502** and a PC **503**, where the TV **502** and the PC **503** are coupled via a game hub **504**. On one end, the game hub **503** is placed in the vicinity of the TV **502** and supplies video and audio signals to the TV **502** by a set of cables or a wireless means (e.g., RF, wireless HDMI or HD).

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On the other end, the game hub **504** communicates with the PC **503** via a wireless means (e.g., RF, Bluetooth or WiFi) to transmit commands or interactions (collectively game) from game controllers being used by game players and receive uncompressed digital streams from the PC **503**. In other words, the PC **503** runs the game and executes commands from the game players and produce corresponding uncompressed digital streams to the game hub **503** that in return causes the TV **302** to display the game with the game actions from the game players. Thus the game hub **504** acts also as a bridge to facilitate a connection between the TV **502** and the PC **503**.

FIG. 6 shows an exemplary function block diagram **600** of a game hub that may be used in FIG. 5. The game hub **600** may support in theory as many players as needed. The game hub **600** as shown in FIG. 6 supports up to four game players at a time, thus including four controller interfaces **602**. Each of the controller interfaces **602** works independently in a sense that the game hub **600** functions as long as there is one controller connected to one of the controller interfaces **602**. A user may manipulate a controller while looking at a TV to, for example, turn, run or punch a in-game object. Depending on implementation, signals or data representing the signals of the game actions from the controller are transported to the game hub **604**. A microprocessor **604** executes one or more modules stored in memory **608** via a bus **606** to process the data representing the game actions from the player. A circuit **614**, collectively representing all other logics in the game hub **600**, is provided to convert the data into a proper form before the data is transported to a PC via a transceiver **610**. Those skilled in the art may understand that, depending on how the data is transported to the PC, the circuit **614** and the transceiver **610** may be implemented differently. There are a number of methods available and well known in the art. Likewise, the circuit **614** receives uncompressed digital streams from the PC and processes and drives the TV through video and audio drivers **612** (e.g., amplifiers).

FIG. 7 shows another configuration **700** according to one embodiment of the present invention, in which functions of a game hub are integrated with a PC **703**. As described above, the PC **703** runs a video game and provides video and audio signals directly to a TV **702** uncompressed digital streams (e.g. wireless HDMI or HD). In any case, the game actions from one or more controllers **706** are coupled directly to the PC **703** via a wireless means (e.g., RF, IR, or Bluetooth) in this embodiment. As described above, a TV is usually placed in a large room (e.g. a family room) for group entertainment while the PC is placed in a small room (e.g., a home office). Since a game player plays the video game in front of the TV and is relatively far from the PC, the controller being used by the player is thus also relatively far from the PC **703**.

According to the embodiment, the PC **703** is equipped with an add-on adaptor, also referred to as an accessory (not shown), that is provided to receive interaction signals from the controller, likely via a wireless means. The accessory may be connected to the PC **703** by a USB connection. In accordance with the interaction signals, the PC **703** manipulates the game being executed therein and provides uncompressed digital streams to the TV **702** via a cable or a wireless means.

The foregoing description of embodiments is illustrative of various aspects/embodiments of the present invention. Various modifications to the present invention can be made to the preferred embodiments by those skilled in the art without departing from the true spirit and scope of the invention as defined by the appended claims. Accordingly, the scope of the present invention is defined by the appended claims rather than the foregoing description of embodiments.

I claim:

1. A device to facilitate a video game to show on a television while the video game is running on a computer, the device comprising:

- at least a controller interface to accommodate a game controller and receive signals from the game controller to be manipulated by a user;
- a first interface to the computer;
- a second interface to a television;
- a microprocessor configured to perform operations of:
 - processing the signals from the game controller;
 - causing the processed signals to be transported to the computer via the first interface;
 - receiving digital streams from the computer; and
 - coupling the digital streams to the television via the second interface, and

wherein the device operates independently, and is disposed in the vicinity of the television and the game controller, and remotely located from the computer, the game controller is used to remotely turn on/off the computer and execute a computer-based non-gaming application.

2. The device as recited in claim 1, wherein the computer is not a game console, and located remotely with respect to the television.

3. The device as recited in claim 1, wherein said coupling the digital streams to the television via the second interface comprises:

- converting the digital streams to a signal in compliance with a TV standard; and
- transmitting the signal to the television by a wireless means or by one or more cables.

4. The device as recited in claim 1, wherein said causing the processed signals to be transported to the computer via the first interface comprises transmitting the processed signals to the computer by a wireless means.

5. The device as recited in claim 1, wherein the computer-based non-gaming application includes a photo display application.

6. The device as recited in claim 1, wherein the computer is installed with programs or modules to be associated with the video game to make the video game more controllable in a sense that the player decides where the video game restarts, transport stats and data pertaining to the video game and start up the video game from another computing device without having to start the video game all over again.

7. The device as recited in claim 2, wherein the digital streams from the computer are uncompressed video streams and audio streams.

8. The device as recited in claim 2, wherein the digital streams from the computer are compressed video streams and audio streams.

9. The device as recited in claim 3, wherein the wireless means includes one of RF, wireless HDMI and wireless HD.

10. The device as recited in claim 7, wherein the microprocessor is configured to convert the uncompressed video streams to a signal in compliance with a TV standard to drive the television.

11. The device as recited in claim 8, wherein the microprocessor is configured to decompress the compressed video streams to produce a signal in compliance with a TV standard to drive the television.

12. The device as recited in claim 8, wherein the compressed video streams are decompressed in the television.

13. A method for playing a video game shown on a television while the video game is running on a computer, the method comprising:

- receiving in a device signals from a game controller to be manipulated by a user;
- processing in the device the signals from the game controller;
- causing the processed signals to be transported to the computer from the device via a first interface in the device;
- receiving in the device digital streams from the computer; and
- coupling the digital streams to the television via a second interface in the device, wherein the device operates independently, is disposed near the television and the game controller, and remotely located from the computer, the game controller is used to remotely turn on/off the computer and execute a computer-based non-gaming application.

14. The method as recited in claim 13, wherein the computer is not a game console, and located remotely with respect to the television.

15. The method as recited in claim 13, wherein said coupling the digital streams to the television via a second interface comprises:

- converting the digital streams to a signal in compliance with a TV standard; and
- transmitting the signal to the television by a wireless means or by a cable.

16. The method as recited in claim 13, wherein said causing the processed signals to be transported to the computer via the first interface comprises transmitting the processed signals to the computer by a wireless means.

17. The method as recited in claim 13, wherein the computer-based non-gaming application includes a photo display application.

18. The method as recited in claim 13, wherein the computer is installed with programs or modules to be associated with the video game to make the video game more controllable in a sense that the player decides where the video game restarts, transport stats and data pertaining to the video game and start up the video game from another computing device without having to start the video game all over again.

19. The method as recited in claim 14, further comprising converting the digital streams to a signal in compliance with a TV standard to drive the television.

20. The method as recited in claim 16, wherein the wireless means includes one of RF, bluetooth and WiFi.

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